

GRADINAROV, L.

"Nonsimultaneous swelling as a symptom of qualitative difference in bean seeds. In Russian."

DOKLADY, Sofia, Bulgaria, Vol. 11, no. 3, May/June 1958.

Monthly List of East European Accessions Index (EEAI), The Library of Congress, Volume 8, No. 8, August 1959.

Unclassified

GRADINAROV, L.

Testing the effect of stimulation on oats fertilized with mineral
fertilizers. Izv Inst biol BAN 11:187-197 '61.
(EEAI 10:9)

(Oats) (Fertilizers and manures)

"APPROVED FOR RELEASE: 03/13/2001

CIA-RDP86-00513R000516520001-1

ZIATAROV, V. Kr.; GRADINAROV, N.P.

Push-pull power amplifier with ultralinear feedback.
Godishnik mash elekt 12 no. 2:95-105 '62 [publ. '63].

APPROVED FOR RELEASE: 03/13/2001

CIA-RDP86-00513R000516520001-1"

GRADINARSKI, G.
SURNAME (in caps); Given Names

Country: Bulgaria

Academic Degrees: not indicated

Affiliation: not indicated

Source: Sofia, Priroda, No. 1, Jan/Feb 61, pp 51-57

Data: "Regulating the Body Temperature of Animals."

GRADINARU, CECILIA.
Rumania /Chemical Technology. Chemical Products
and Their Application
Water treatment. Sewage water.

H-5

Abs Jour: Referat Zhur - Khimiya, No 1, 1958, 1738

Author : Zapan M., Vrabiescu Elvira, Gradinaru Cecilia,
Herscovici I., Parotta N.

Title : Hardness of Water Used at Some Petroleum Refineries.

Orig Pub: Petrol si gaze, 1956, 7, No 11, 599-603

Abstract: An account of the results of determination of
water hardness at 4 petroleum refineries.

Card 1/1

GRADINARU, I. APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R000516520001-1

RUMANIA

MICU, I.; OANA, C.; MANTA, I.; IOAN, Elena; CUCIUREANU, Georgeta;
MIHUL, Valentina; VINTU, C.; GRADINARU, Liliana; GRADINARU, I.;
IOSEFSOHN, Judith; MINASCURTA, S.; MOSANU, P.; COTAE, Gh.

Clinic of Contagious Diseases Iasi, Iasi Regional Sanepid.
(Clinica de boli contagioase Iasi, Sanepidul regional Iasi.)
- (for all)

Bucharest, Viata Medicala, No 7, 1 Apr 63, pp 457-460.

"Epidemic of Ornithosis in a Rural Locality."

(13)

GRADINARU, LILIANA

RUMANIA

MICU, I.; OANA, C.; MANTA, I.; IOAN, Elena; CUCIUREANU, Georgeta;
MIHUL, Valentina; VINTU, C.; GRADINARU, Liliana; GRADINARU, I.;
IOSEFSOHN, Iudith; MINASCURTA, S.; MOSANU, P.; COTAE, Gh.

Clinic of Contagious Diseases Iasi, Iasi Regional Sanepid.
(Clinica de boli contagioase Iasi, Sanepidul regional Iasi.)
- (for all)

Bucharest, Viata Medicala, No 7, 1 Apr 63, pp 457-460.

"Epidemic of Ornithosis in a Rural Locality."

(13)

GRADINARU, N.

BIOLOGICAL PLANTS. Cereals.

Abstr. No.: Rep. Biur.-Nech., No 17, 1958, TITR.

Author : David A. J. Palau, V. I. Svetan, I. I. Zelenin, I. I.
 Dachkov, N. M. Mel'chen, G. I. Pop, O. I. Shcherbin, T. I.
 Glazunov, V. I. Gerasimov, N. I. Il'ina, A. I. Starostin, Z. I.
 Basov, S. I. Dobrov, E. I. Cherednyuk, E.

Inst. : On the Problem of Varieties Varieties of Winter Wheat
 and of Winter and Spring Barley and Rice 210
 Districts.

Orig. Pub: As Inst. ocherk. agron., 1957, 3b, no 5, 213-279.

Abstract: Results of a comparative study at experimental stations of the Scientific-Research Agency of the Institute of Varieties of varieties divided into districts and those newly developed for 1949-1952. In regard to winter wheat, good results were shown of the variety divided into districts "Ochend" 117 and the new variety "Tyrra Primes" 16, divided into the steppe and forest-steppe regions of Moldavia, and "Ozergan" 77. In the forest areas of both slopes of the Carpatic and Western Mountain (Mistay Apusen) the variety "Graude" 117 proved. In the steppe and forest-steppe regions of the western part of Moldavia, "Order" 261, divided into districts in Tiraspol, is regarded a barley variety. "Ochend" 305 is considered as a winter and front wheat, is divided into all zones of cultivation or winter barley. As regards

Card : 1/3

5

wheat, good results were shown of the variety divided into districts "Ochend" 117 and the new variety "Tyrra Primes" 16, divided into the steppe and forest-steppe regions of Moldavia, and "Ozergan" 77. In the forest areas of both slopes of the Carpatic and Western Mountain (Mistay Apusen) the variety "Graude" 117 proved. In the steppe and forest-steppe regions of the western part of Moldavia, "Order" 261, divided into districts in Tiraspol, is regarded a barley variety. "Ochend" 305 is considered as a winter and front wheat, is divided into all zones of cultivation or winter barley. As regards

Card : 1/3

5

winter barley, the best variety - "Tyrra Prince" 260, is divided into districts in the steppes and forest-steppe regions of Moldavia, Southern, Northern and Eastern, and "Ozergan" 77, which is divided into districts in all regions of steppes and forest-steppe regions of Moldavia. As regards onto the best variety - "Tyrra Primes" 16, is divided into districts in the steppe and forest-steppe regions of Moldavia, in Dobrogea, Mistatye and Chetalye, and "Ozergan" 77, which is divided into districts in the central part of Transylvania. — A. P. Kolychev.

Card : 1/3

6

5(1)
AUTHOR:

RUM/3-59-8-5/32

Grădinaru, N.

TITLE:

The Superphosphate and Sulfuric-Acid Plant of Năvodari ✓

PERIODICAL: Revista de chimie, 1959, Nr 8, pp 447-449 (Rumania)

ABSTRACT:

The installation for the production of sulfuric acid was put into operation during the last three months of 1958, at Năvodari, in accordance with the Decision of the 2nd Congress of the Rumanian Workers' Party. The section for the production of superphosphate began production in the first quarter of 1959. The new chemical unit for the production of fertilizers is situated over about 64 hectares near the village of Năvodari. The plant was built in 1955-1958. Substantial aid is said to have been received from the USSR. For example, the site of the plant was chosen in cooperation with a group of Soviet specialists from the Institutes of Special Projects of Moscow. The general projects, the technical projects and plans were also supplied by the same Soviet institute. Soviet specialists have helped Rumanian workers, technicians, and

Card 1/2

RUM/3-59-8-5/32

The Superphosphate and Sulfuric-Acid Plant of Navodari

engineers during the construction works. A significant part of the basic technological equipment and most of the electric automation and control equipment are of Soviet origin. The roasting of pyrites is made through the modern fluidized-bed method. There are 3 main parallel groups of buildings for the production of sulfuric acid, simple and granulated superphosphate, as well as for accessory rooms such as a modern canteen, garage, sanitary point, etc. A line of buildings, perpendicular to the three lines mentioned contains workshops, bath, mechanical laundry, central laboratory, material stores, station of transformers, thermal power plants. Various details are given on the sulfuric acid section and the sections for superphosphate. The description includes the principles of chemical processes. A workers' colony was built in the village of Navodari, with social and cultural units. There are 4 photographs.

Card 2/2

FERENCZY, St., ing.; MITROFANOVICI, V.; HARANGOZO, Nicolae; GALOSI,
Tiberiu; TEODORESCU, S., dr.; MIHALACHE, Stefan; HERSTIG, I.;
~~GRADINARU, N.~~; CASSABALIAN, S.

Reducing the cost price in the chemical industry. Probleme
econ 16 no.10:153-160 0 '63.

1. Director, Intreprinderea "Solventul", Timisoara (for Ferenczy).
2. Ing. sef adjunct, Intreprinderea "Solventul", Timisoara (for Mitrofanovici).
3. Director, Fabrica de lacuri si vopsele din Timisoara (for Harangozo).
4. Director, Fabrica chimica Timisoara (for Galosi).
5. Director, Intreprinderea Industriala de Stat "Tableta", Bucuresti (for Teodorescu).
6. Contabil sef, Intreprinderea Industriala de Stat "Tableta", Bucuresti (for Mihalache).
7. Director, Fabrica de medicamente "Biofarm", (for Herstig).
8. Director, Uzina de superfostati si acid sulfuric Navodari (for Gradinaru).
9. Sef serviciu plan, Uzina de superfosfati si acid sulfuric Navodari (for Cassabalian).

G. M. Kozolupoff

Reaction of diethyl phosphate with sodium alkyl esterates
V. K. Kuskov and T. Kh. Grabis (M. V. Lomonosov Univ.,
Moscow). *DOKLADY AKADEMII NAUK S.S.R.* 92, 323-4
(1953).—Heating $(Et_2O)_2POH$ with various alkyl esterates in the
presence of the corresponding RONa only two esterifications
takes place, yielding $(RO)_2POH$. Yields of 85% are com-
mon with only a small amt. of RONa being necessary.
molar quantities of the catalyst fails to change the course
of the reaction. Thus 0.3 mole ROH contg. 0.3 g. Na was
mixed with 13.8 g. $(Et_2O)_2POH$ and heated under a simple
fractionating column until the vapor temp. was maintained
at 90-5°, gave the desired $(Et_2O)_2POH$. Thus were prep'd.
 $(PrO)_2POH$, 86%, b.p. 70-2°; $(BuO)_2POH$, 84.5%, b.p.
115°; $(iso-BuO)_2POH$, 87%, b.p. 111-13°; $(iso-AmO)_2$
 POH , 88%, b.p. 99-100°; $(C_4H_9O)_2POH$, 70%, b.p. 62-3°.
The prep'n. of the cyclohexyl deriv. required bath
temp. 100-90°; the others gave good results at somewhat
lower temps. The results are quite contrary to those
claimed by Janecek (*Roczniki Chem.* 6, 116 (1935); *C.A.*
20, 1052) who reported formation of Et_2O and $(Et_2O)_2PO$
 $(H)ONa$. The prep'n. of $(Et_2O)_2P$ and $(Et_2O)_2PO(H)ONa$
reported by J. (*C.A.* 21, 3599) is also in doubt.

G. M. Kozolupoff.

Y/001/63/000/002/004/006
D294/D308

AUTHOR: Gradistar, Živojin, Engineer

TITLE: On the possibility of shortening aircraft take-off distance

PERIODICAL: Tehnika, no. 2, 1963, 220-224

TEXT: This article was originally submitted as a report at the Conference on Theoretical and Applied Mechanics in Split, June 4-10, 1962. The performance of aircraft with auxiliary rocket engines is described and the impact is analyzed of the angle of climb δ (inclination to the longitudinal axis of aircraft). Professor Pivko's method (Proceedings of the Institute of Aeronautics, V3. 075, Belgrade, 1954) was utilized to assess the equations for the lengths of two phases of the take-off path (running on the ground and subsequent climbing to 15 m). Validity of the expression used for thrust is limited to the rocket and propeller type aircraft (it is useful for jets as an approximation). Equations are given for the optimal climb angles in each of two take-off phases as well as for the total

Card 1/2

Y/001/63/000/002/004/006
D294/D308

On the possibility ...

take-off path. Calculations for typical modern aircraft show a broad minimum around $\delta = 45^\circ$ which corresponds to the shortening of take-off distance of 15% and 23% as compared with the distances at $\delta = 0^\circ$ and $\delta = 90^\circ$ respectively. There are 3 figures.

ASSOCIATION: Vazduhoplovnotehnički institut, Beograd, Žarkovo
(Institute of Aeronautics, Belgrade, Žarkovo)

Card 2/2

MIKLASHEVSKIY, Yevgeniy Pavlovich; MEL'GUNOV, Nikolay Fedorovich;
GRADISHCHEV, N.Ye., nauchnyy red.; ISHKHANOV, V.S., red.;
TOKER, A.M., tekhn.red.

[Vibratory building machinery] Vibratsionnye stroitel'nye
mashiny. Moskva, Vses.uchebno-pedagog.izd-vo Proftekhnizdat,
1950. 114 p.
(Building machinery)

SHESTOPEROV, S.V., kandidat tekhnicheskikh nauk; IVANOV, F.M., kandidat tekhnicheskikh nauk; ZASHCHEPIN, A.N., kandidat tekhnicheskikh nauk; LYUBIMOVA, T.Yu., kandidat khimicheskikh nauk; GRADISHCHEV, N.Ye., redaktor; KOVALIKHINA, N.P., tekhnicheskiy redaktor.

[Concrete with plasticiser agents] TSementnyi beton s plastifitsiruiushchimi dobavkami. Moskva, Izd-vo dorozhno-tekhn.lit-ry Gushosdora MVD SSSR, 1952. 105 p. [Microfilm] (MIRA 9:3)
(Concrete)

MOROZOV, Valentin Ivanovich; GRADISHCHEV, N.Ye., red.; KOGAN, F.L.,
tekhnicheskiy redakteY.

[Concrete plants for automobile road construction] Sistemnye
zavedy dlia stroitel'stva avtomobil'nykh derog. Moskva, Nauchno-
tekhnicheskoe izd-vo avtotransportnoi lit-ry, 1955. 79 p.
(Concrete plants) (MLRA 9:5)

GRADISHCHEV NIKOLAY YEFIMOVICH

CHARUYSKIY, Aleksandr Petrovich; MIKLASHEVSKIY, Yevgeniy Pavlovich,
laureat Stalinskoy premii; GRADISHCHEV, Nikolay Yefimovich; KHAZAN,
I.A., redaktor; KOGAN, F.L., tekhnichesklyy redaktor.

[Manual for the concrete worker in the construction of bridges and
culverts] Pesobie betonshchiku na stroitel'stve mostov i trub.
Izd. 2-e, perer. Moskva, Nauchno-tekhn.izd-vo avtotransp. lit-ry
1955. 153 p. (MLRA 8:12)
(Bridges, Concrete) (Pipes, Concrete)

GRADISHCHEV, Nikolay Yefimovich; inzhener; SKAVRONSKIY, B.I., kandidat
tekhnicheskikh nauk, nauchnyy redaktor; BYKOVA, Zh.A., redaktor;
RAKOV, S.I., tekhnicheskiy redaktor

[Testing building materials] Ispytanie stroitel'nykh materialov.
Moskva, Vses.uchebno-pedagog.izd-vo Trudrezervizdat, 1957. 234 p.
(Building materials--Testing) (M1PA 10:10)

KONOROV, Aleksandr Vladimirovich; CHUYKO, Aleksandr Vladimirovich;
GRADISHCHEV, N.Ye., nauchnyy red.; NIKOLAYEVA, N.M., red.;
GOROKHOV, Yu.N., tekhn.red.

[Modern insulating materials in building and in engineering]
Sovremennye izoliatsionnye materialy v stroitel'stve i tekhnike.
Moskva, Vses.uchebno-pedagog.izd-vo Trudrezervizdat, 1958.
158 p. (MIRA 12:?)
(Insulating materials)

GRADISHCHEV N.Ye.

SHEYKIN, Aleksandr Yefremovich, SKAVRONSKIY, Boris Ivanovich, TIKHONOV,
Aleksandr Yakovlevich, BASKAZOV, Nikolay Sergeyevich, GRADISHCHEV,
N.Ye., inzh.red.; ROBROVA, Ye.N., tekhn.red.

[Building materials] Stroitel'nye materialy. Moskva, Gos.transp.
zhelez-dor. izd-vo, 1958. 386 p. (MIRA 11:8)
(Building materials)

MUKHINA, Tat'yana Gerasimovna; GRADISHCHEV, N.Ye., nauchnyy red.;
BEREZOVSKAYA, A.L., red.; DORODNOVA, L.A., tekhn. red.

[Production of silicate brick] Proizvodstvo silikatnogo kирпича.
Moskva, Proftekhsdat, 1962. 130 p. (MIRA 16:1)
(Sand-lime brick)

GRADISHCHEV, Nikolay Yefimovich; STRATILATOVA, K.I., red.; DORODNOVA,
K.I., tekhn. red.

[Teaching the science of materials to stone masons;
methodological manual for teachers in trade schools] Pre-
podavanie materialovedeniia kamenshchikam; metodicheskoe
posobie dlja prepodavatelei professional'no-tehnicheskikh
uchilishch. Moskva, Proftekhizdat, 1963. 91 p.
(MIRA 17:3)

OGARKOV, Nikolay Alekseyevich; LYAKHOVA, Raisa Fedorovna; GRADISHCHEV,
N.Ye., nauchn. red.; STAROVETOVA, V.G., red.

[Laboratory experiments for the course on "Science of materials" for finishers] Sbornik laboratornykh rabot po kursu "Materialovedenie" dlia otdelochnikov; metodicheskoe posobie dlia
PTU. Moskva, Vysshiaia shkola, 1964. 90 p. (MIRA 17:7)

GRADISNIK, Franc, inz.

Autobus integral bodies and their development. Stroj vest 8 no.4/5:
138-141 O '62.

1. Tovarna avtomobilov in motorjev, Maribor.

GRADISNIK, Milan, ing.

The deepest drilling well in Yugoslavia, RK-1. Nafta Jug 12
no. 3/4:100-103 Mr..Ap '61.

1. Proizvodnja nafte, Lendava.

STOJANOVIC, Svetislav, prof., dr.; GRADISTANAC, Dobrivoje; NIKOLIC, Zarko;
SIMIC, Petar

Arthrodesis of the carpus (radiocarpal joint). Srpski arh. celok.
lek. 89 no.9:829-834 S '61.

1. Klinika za ortopedsku hirurgiju i traumatologiju Medicinskog
fakulteta Univerziteta u Beogradu. Upravnik: prof. dr Svetislav
Stojanovic.

(WRIST surg)

19 8200

S/126/62/013/005/023/031
E202/E492AUTHORS: Gradkovskiy, V.A., Karelina, N.A.

TITLE: Effect of boron in alpha iron on the yield plateau

PERIODICAL: Fizika metallov i metallovedeniye, v.13, no.5, 1962,
772-774

TEXT: Since it was observed by A.H.Cottrell and B.A.Bilby (Proc. Phys. Soc., 62A, 49, 1949, 349) that small additions of N and C to the α -iron cause an appearance of a characteristic yield plateau in the stress-elongation diagrams, the authors investigated the effect of boron additions on the same.

99.9% Armco iron with B additions ranging from 0.01 to 0.1% were used. Melts were carried out under vacuum (10^{-3} mm Hg), and boron was introduced as ferroboron; after melt the metal was forged and drawn. Before tests the metal was annealed for three hours in vacuum at 800°C . The plastic deformation tests were carried out at room temperature using an installation constructed by V.N.Kunin (Uch. zapiski ChGPI, v.5, no.1, 1958, 107) and deforming the samples at a rate of 4 mm /min. In addition to these tests measurement of the change of the thermoelectric emf, with respect

Card 1/3

JB

Effect of boron ...

S/126/62/013/005/023/031
E202/E492

JB

to percentage elongation, was also undertaken. The thermocouples used were kept at $0 \pm 0.1^\circ\text{C}$ and the resulting emf was measured on a mirror galvanometer with an accuracy of $0.088 \mu\text{V/mm}$ of the scale. The temperature gradient between the thermocouples was of the order of 15 to 16°C . The mechanical tests showed that additions of 0.01% boron produce already discernible yield plateau while those of 0.1% cause the appearance of a sharply defined plateau with clear upper and lower yield points. The extent of the plateau corresponds to approximately 3% of the relative elongation. The method of thermoelectric emf was found more sensitive than the mechanical tests. Plots of $\mu\text{V}/^\circ\text{C}$ versus % elongation gave a linear relation before the definite plastic deformation was reached with the bend occurring at the critical point of the deformation - these plots were very similar to those obtained for low carbon steel. The corresponding microstructural changes were also briefly described. It was concluded that the addition of boron to α -iron leads to the appearance of a well-defined yield plateau, while in the corresponding emf plot the latter increases in the region of plateau proportionally with the

Card 2/3

Effect of boron ...

S/126/62/013/005/023/031
E202/E492

degree of deformation, while the value of critical deformation at which there is a bend in the emf vs deformation curve depends on the length of the yield plateau. There are 2 figures.

ASSOCIATIONS: Chelyabinskii nauchno-issledovatel'skiy institut metallurgii (Chelyabinsk Scientific-Research Institute of Metallurgy)
Chelyabinskii pedagogicheskiy institut (Chelyabinsk Pedagogical Institute)

SUBMITTED: September 18, 1961 (initially)
January 2, 1962 (after revision)

Card 3/3

GRADNIK, Sergej, inz. (Lesce)

Automatic control of the batch-type furnace in the rolling mill 2400 of the Jesenice Iron Works. Avtomatika 3 no.4:
249-254 Ag '62.

GRADNIK, Sergej, diplomirani inzenir (Lesce)

Flow gauges made at the Factory for Industrial Equipment of Lesce.
Automatika 4 no.4:260-262 '63. -

1. Tovarna industrijske opreme TIO, Lesce.

GRADNIK, Sergej, dipl. inz.

Flowmeters produced in the TIO Enterprise, Lesce. Automatika
5 no.5:409-411 '64.

1. TIO Enterprise, Lesce.

SEMIBRATOV, V.N.; GRADNIKOV, V.A.; BASHINSKIY, S.V., otv.red.; TEMKINA,
Ye.L., tekhn.red.

[Unified handbook of wages and job descriptions for operations and
occupations in the field of construction and repair] Edinyi tarifno-
kvalifikatsionnyi spravochnik rabot i professii rabochikh, zaniatykh
v stroitel'stve i na remontno-stroitel'nykh rabotakh (ETKS), 1960 g.
Moskva, Gos.izd-vo lit-ry po stroit., arkhit. i stroit.materialam,
1960. 190 p. (MIRA 14:4)

1. Russia (1923- U.S.S.R.) Gosudarstvennyy komitet po delam stroi-
tel'stva. 2. Nauchno-issledovatel'skiy institut ekonomiki stroi-
tel'stva Akademii stroitel'stva i arkhitektury SSSR (for Semibratov).
3. Tsentral'noye normativno-issledovatel'skoye byuro pri Nauchno-
issledovatel'skom institute ekonomiki stroitel'stva Akademii stroi-
tel'stva i arkhitektury SSSR (for Gradnikov). (Building trades)

ANTONOV, N.G., gornyy inzh.; GRADOBIK, A.N., gornyy inzh.

Industrial testing of new explosives. Gor.zhur. no.8:36-39.
Ag '62. (MIRA 15:8)

1. Magnitogorskiy metallurgicheskiy kombinat.
(Explosives—Testing)

ANTONOV, N.G., gornyy inzh.; GRADOBIK, A.N., gornyy inzh.; KOROBOCHKIN, K.I.,
gornyy inzh.

Mastering the P-25 roller-boring machine at the Magnitogorsk mine.
Gor.zhur. no.3:39-41 Mr '65. (MIRA 18:5)

1. Gornoye upravleniye Magnitogorskogo metallurgicheskogo kombinata.

"APPROVED FOR RELEASE: 03/13/2001

CIA-RDP86-00513R000516520001-1

ANTONOV, N.G., inzh.; GRADOBIK, A.N.

The SBSH-250 machine. Mekh. i avtom. proizv. 19 no.9:
12-13 S '65. (MIRA 18:9)

APPROVED FOR RELEASE: 03/13/2001

CIA-RDP86-00513R000516520001-1"

ANTONOV, N.G., gornyy inzh.; GRADOBIK, P.N., gornyy inzh.

Efficient use of KZDSh-58 pyrotechnical relays in the Magnitogorsk
Mine. Gor.zhur. no.1:73-74 Ja '63. (MIRA 16:1)

1. Gornoye upravleniye Magnitogorskogo metallurgicheskogo
kombinata.

(Magnitogorsk region--Blasting--Equipment and supplies)

GRADOBOYEV, Nikolay Dmitriyevich.

Academic degree of Doctor of Agricultural Sciences, based on his defense, 29 October 1954, in the Council of the Omsk Agricultural Inst imeni Kirov, of his dissertation entitled: "Soils of the Khakas Autonomous Oblast."

Academic degree and/or title: Doctor of Sciences

SO: Decisions of VAK, List no. 10, 30 Apr 55, Byulleten' MVO SSSR, No. 15, Aug 56, Moscow, pp. 5-24, Uncl. JPRS/NY-537

USSR/Cultivated Plants - Grains.

M-2

Abs Jour : Ref Zhur - Biol., No 7, 1958, 29714

Author : Gradoboyev, N. I. Chemyakina, A.

Inst :

Title : Corn on Solonetz Soils.

Orig Pub : S. kh. Sibiri, 1957, No 5, 35-40

Abstract : Observations made for a period of two years at the Nazvyayevskiy variety plot and in the sovkhozes and kol-khozes of Omskaya Oblast' have shown that the corn yield does not depend on the degree of soil salinity, but rather on the thickness of the arable horizon. Corn may be raised successfully on solonetz soils having a thickness to its compost-composed arable horizon of more than 18 cm. It is recommended for soils less than 18 cm thick in their arable horizon that compost or manure be applied, the seeding rate be raised and that broad-row sowing be used. With wide-row sowing the cob yield varied, depending on

Card 1/2

- 38 -

USSR/Cultivated Plants - Grains.

M

Abs Jour : Ref Zhur Biol., No 18, 1958, 82313

Author : Gradoboyev, N.D?, Migutskiy, A.S.

Inst : Omsk Agriculture Institute

Title : Corn on Saline Soils.

Orig Pub : Tr. Omskogo s.-kh. in-ta, 1957, 22, No 1, 111-116

Abstract : In the saline regions of Siberia, corn should be planted on soils with a humus horizon of not less than 18 centimeters. For the depth of 15-18 centimeters, application of not less than 30 tons per hectare of humus or manure over the entire massif and into the pockets is necessary.

Card 1/1

GRADOBOYEV, Nikolay Dmitriyevich; PRUDNIKOVA, Vera Mikheyevna; SMETANIN,
Ivan Semenovich; MAKHROV, M.K., red.; SHATOKHIN, V.I., tekhn. red.

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R000516520001-1

[Soils of Omsk Province] Pochvy Omskoi oblasti. Omsk, Omskoe
knizhnoe izd-vo, 1960. 372 p. (MIRA 14:9)
(Omsk Province--Soils)

"APPROVED FOR RELEASE: 03/13/2001

CIA-RDP86-00513R000516520001-1

KRYLOV, G.V., doktor biol. nauk; GRADOBOYEV, N.D.; YUDIN, B.S.;
KABANOV, N.Ye.

Review and bibliography. Izv. SO AN SSSR no.8 Ser. biol.-med.
nauk no.2:150-154 '64
(MIRA 18:1)

APPROVED FOR RELEASE: 03/13/2001

CIA-RDP86-00513R000516520001-1"

(A) (N) I 11164-66 EMT(1)/T LIP(c)

ACC NR: AP6000363

SOURCE CODE: UR/0286/65/000/021/0057/0057

AUTHORS: Volosov, D. S.; Stefanskiy, M. S.; Isayeva, I. Ye.; Gradoboyeva, N. A.

36
Q

ORG: none

TITLE: Objective with variable focal length. Class 42, No. 176094

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 21, 1965, 57

TOPIC TAGS: optic lens, photographic equipment

ABSTRACT: This Author Certificate presents an objective with variable focal length, consisting of a variable magnification adapter. The adapter includes four components, two of which are mounted for synchronous motion along the optical axis. One of the components is fixed for the whole range of focal length variation and serves for focusing the objective at a finite distance. To maintain the constancy of the position of the image plane while simplifying the mechanical design of the objective mounting, the adapter components are made with lens powers of alternating signs (see Fig. 1). The second and third components are mounted for synchronous motion in mutually opposite directions along the optical axis of the objective. The motion of the fourth component of the adapter has a nonlinear dependence on the motion of the second and third components.

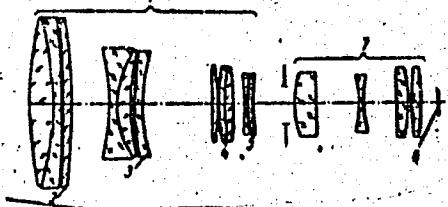
Card 1/2

UDC: 535.813:535.317.226:771.351.76

L 11164-66

ACC NR: AP6000363

Fig. 1. 1 - Adapter; 2, 3, 4, and
5 - components of adapter;
6 - image plane; 7 - objective.



Orig. art. has: 1 diagram.

SUB CODE: 14/ SUBM DATE: 07Sep64

BC
Card 2/2

37052
S/032/62/028/005/002/009
B117/B101

18.1V45

AUTHORS: Voronezhskaya, I. A., Mladentseva, O. I., Aksanova, A. V.,
and Gradoboyeva, R. A.

TITLE: Spectroscopic analysis of the magnesium alloy МЛ-11 (ML-11)

PERIODICAL: Zavodskaya laboratoriya, v. 28, no. 5, 1962, 557-558

TEXT: The rare earths (Ce, Nd, Pr, La) as well as Zn and Zr contained in the new heat-resistant magnesium alloy МЛ-11 (ML-11) were determined by spectrochemical analysis. This method, which is similar to that described by Sh. G. Melamed, S. M. Polyakov, M. G. Zemkova (Zavodskaya laboratoriya. XXVI, 5, 554 (1960)), is based on the use of synthetic powder samples of known composition. The rare earths are completely removed before the spectrographic determination begins. A photographic technique of spectroscopic analysis, based on the use of solid standards, was devised. The apparatus used, consisted of an МСН-28 (ISP-28) spectrograph (slit width, 23 μ) and an МГ-3 (IG-3) generator (burning time 20 sec, time of exposure 30 sec) for the determination of Zn, Zr, Ce, and La, and

✓

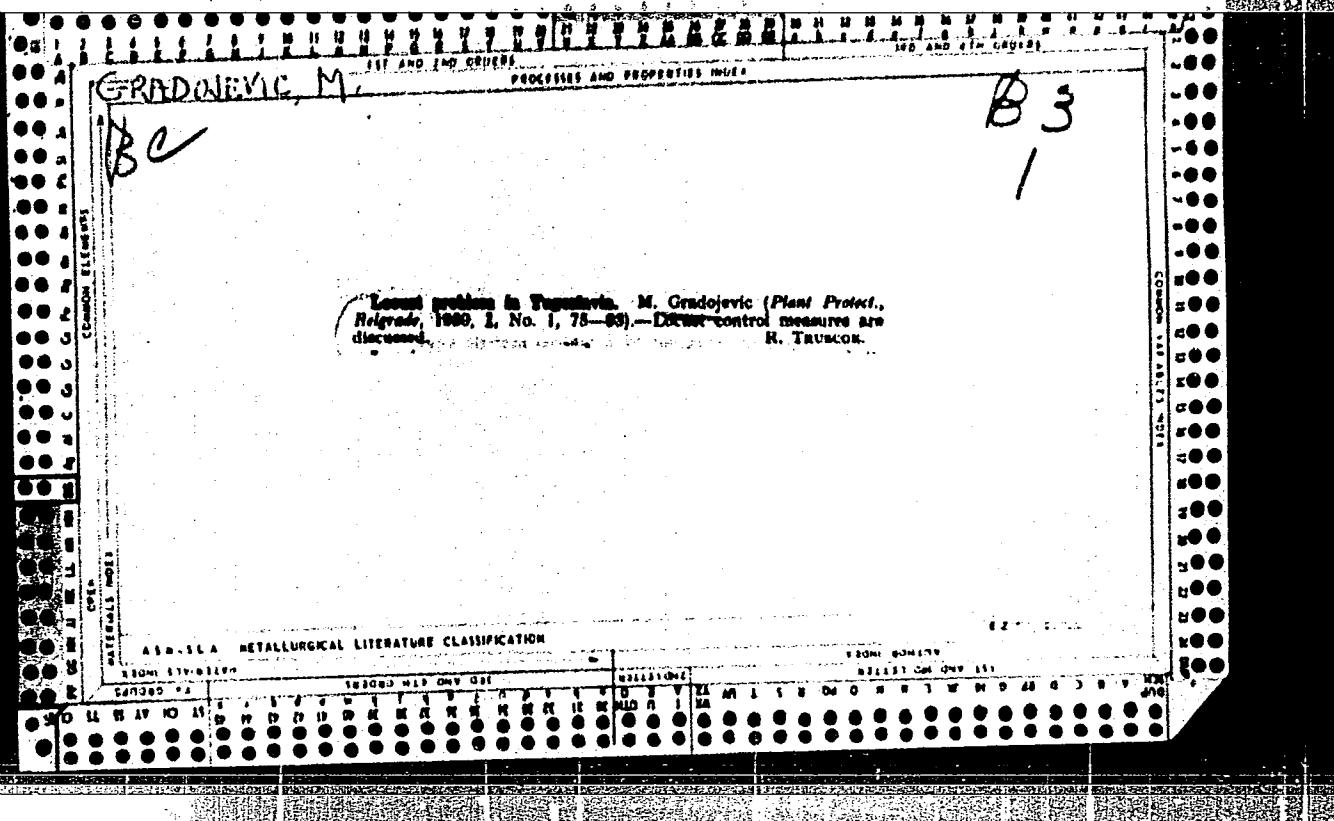
Card 1/2

Spectroscopic analysis of the ...

S/032/62/028/005/002/009
B117/B101

a ΔφC -13 (DFS-13) high-dispersion apparatus (slit width, 15 μ) for Nd and Pr determination (burning time 20 sec, time of exposure, 2.5 min). The relative error of the analysis was \pm 3-5%. The photographic method may facilitate the adoption of spectroscopic analysis by industry.

Card 2/2



GRADOJEVIC, M.

Chemical or biological warfare? p. 24.
(HEMIZACIJA POLJOPRIVREDE. JOURNAL OF FERTILIZERS AND CROP PROTECTION. No. 2,
1956. Yugoslavia.)

SO: Monthly List of East European Accessions (EEAL) LC, Vol. 6, no. 7, July 1957. Uncl.

BEK-UZAROV, Dorde, dipl. fiz., saradnik (Beograd, Cvijiceva 63);
GRADOJEVIC, Vojin, stud. fizike, saradnik; DOBRILOVIC, Ljiljana,
dipl. fiz., saranik

Identification and measurement of activity in radioactive sources.
Tehnika Jug 17 ho.10: Suppl.: Radioizotopi zrac 1 no.10:1853-1859)
0 '62.

1. Institut za nuklearne nauke "Boris Kidric", Vinca-Beograd.

DOBRLOVIC, Ij.; BEK-UZAROV, D.; GRADOJEVIC, V.; PALIGORIC, D.

Liquid scintillation counter used in the analysis of pure
beta emitters; abstract. Glas Hem dr 27 no. 9/10:56 '64

1. The Boris Kidric Institute of Nuclear Sciences, Department of Analyses and Metrology, Belgrade-Vinca.

BEK-UZAROV, D.; GRADJEVIC, V.

A device for affixing a definite dead time on the GM counters;
abstract. Glas Hem dr 27 no.9/1G:564 '64

1. The Boris Kidric Institute of Nuclear Sciences, Department
of Analyses and Metrology, Belgrade-Vinca.

GRADOJEVIC, Z.

"Ecology and Development of the Lucerne Flea (Phytodecta Formicata Bruggm.
[Col., Chrysomelidae])" p. 1
(ZBORNIK RADOVA, Vol. 31, 1953, Beograd, Yugoslavia)

SO: Monthly List of East European Accessions, LC, Vol. 3, no. 5, May 1954/Unc1.

YUGOSLAVIA/General and Systematic Zoology. Insects. Harmful Insects and Acarids. Fodder Pests P

Abs Jour : Ref Zhur - Biol., No 3, 1959, No 11622

Author : Gradojević Z.
Inst : Serbian Academy of Sciences.
Title : Ecology and Development of the Leaf-Beetle
Phytodacta fornicate.

Orig Pub : Zb. radova. Srpska AN, 1953, 31, 1-50

Abstract : The exceptionally wide distribution of the leaf-beetle *Ph. fornicate* in countries of the Balkan Peninsula is conditioned by the mild, warm and moderately humid climate. The beetle is found only in alfalfa fields and, apparently, is monophagous. In Yugoslavia, six forms of *Ph. fornicate* have been established. They are distinguished according to color and quantity (or absence) of

Card : 1/2

- 25 -

Jour : Ref Zhur - Biol., No 3, 1959, No 11622

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spots on the upper surface. Laboratory experiments establish that one female devours about 1 g. of fresh alfalfa leaves during its lifetime; the male (the number of which exceeds that of the female by 5.7 times), 0.354 g.; the larva,

Card : 2/2

YUGOSLAVIA/General and Systematic Zoology. Insects. Harmful Insects and Acarids. Fodder Pests P

Abs Jour : Ref Zhur - Biol., No 3, 1959, No 11621

Author : Gradojević Z.

YUGOSLAVIA/General and Systematic Zoology. Insects. Harmful Insects and Acarids. Fodder Pests.

Abs Jour : Ref Zhur - Biol., No 3, 1959, No 11621

develops only on the species of the genus Medicago. On the other hand, A is a strict xenophyte, originating in the steppes and semi-deserts of Central Asia. It was transported into Eastern Europe across the lands of the Middle and Near East and it penetrated into Southwestern Europe from North Africa across the Pyrenean peninsula. The distribution of Ph. fornicata over Europe to the north is limited by excessive humidity of the climate, and in southern regions its development is limited by the absence of low temperatures necessary for the transition of the beetles in spring into the active state. In its distribution, the pest reiterates the route of the dispersion of A, following it everywhere when not obstructed by

Card : 2/3

- 24 -

YUGOSLAVIA/General and Systematic Zoology. Insects. Harmful Insects and Acarids. Fodder Pests.

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R000516520001-1

insurmountable geographic barriers. In the Western European region's cultivation of A, Ph fornicata is absent, because A penetrated there through a barrier, which is inaccessible to the pest (a sea sound). In the Pannon lowland, one of the largest regions in Europe for the cultivation of A, this species, as well as its fodder plant, possess ecological conditions closely approximating those of their natures, thereby causing the unusual harmfulness of Ph. fornicata in this region. -- B.S. Kuzin

Card : 3/3

GRADOV, A.P.

Method of the analysis and indices of production specialization
based on the assortment of finished products. Trudy LPI no.244:
14-23 '65.
(MIRA 18:5)

KARLIK, Ye.M.; GRADOV, A.P.

Working out a plan for machinery manufacturing branch specialization in a large economic region; based on the example of instrument manufacturing. Trudy LPI no.244:24-33 '65.

Concentration and specialization of production in the radio industry of the U.S.A. Ibid.:44-56
(MIRA 18:5)

VASIL'YEV, M.; GUSHCHEV, S.; NESMEYANOV, A.N., akademik; SHCHERBAKOV, D.I., akademik;
ENGEL'GARDT, V.A., akademik; ZHEREBAK, A.R., prof.; LEBEDEV, S.A.,
akademik; ZENKEVICH, L.A.; GRADOV, A.S.; GOLODOVSKIY, M.G., prof.;
STANYUKOVICH, K.P., prof.

Ahead with the dream! Znan.sila 33 no.12:24-25 D '58.
(MIRA 11:12)

1. Chlen-korrespondent AN SSSR (for Zendevich). 2. Direktor Nauchno-
issledovatel'skogo instituta proyektirovaniya obshchestvennykh zdaniy
i sooruzheniy (for Gradov).
(Science)

"APPROVED FOR RELEASE: 03/13/2001

CIA-RDP86-00513R000516520001-1

GRADOV, B.V., APCILLOSOV, V.M.

rabot "Mechanized Excavation Work" Organizatsiya i proizvolstvo gidrotekhnicheskikh
1950

APPROVED FOR RELEASE: 03/13/2001

CIA-RDP86-00513R000516520001-1"

GRAICOV, B. V.

I D 941315

Organizatsiya i prizvodstvo gidrotekhnicheskikh rabot. Moscow, 1950. 439 p.
The book describes the organization and production of hydro-technical works in
connection with the construction of rural hydro-electric power stations. It
includes preparatory work and plans, steel construction, organization of
labor, and fire prevention measures.

1. Russia--Electric Power Plants

GRADOV, F.F., inzh.

Automatic coupling for industrial electric trucks. Khol.
tekh. 38 no.6:45-47 N-D '61. (MIRA 15:1)
(Industrial electric trucks)

"APPROVED FOR RELEASE: 03/13/2001

CIA-RDP86-00513R000516520001-1

GRADOV, G.

At the Institute of Economics of the Academy of Sciences of the
Ukrainian S.S.R. Vop. ekon. no.8:137-139 Ag '58. (MIRA 11:9)
(Ukraine--Economics--Study and teaching)

APPROVED FOR RELEASE: 03/13/2001

CIA-RDP86-00513R000516520001-1"

GRADOV, G.

Research of the Economics Institute of the Academy of Sciences of
the Ukrainian S.S.R. Vop. ekon. no.3:155-157 Mr '57. (MIRA 10:6)
(Ukraine--Economics--Study and teaching)

GRADOV, G.

Study of new labor forms in the building of communism. Vop. ekon.
no.3:146-148 Mr '60. (MIRA 13:2)

1.Uchenyy sekretar' Instituta ekonomiki AN USSR.
(Efficiency, Industrial)

ALEKSANDROV, P.A.; ESTROV, Z.I.; GRADOV, G.A., kandidat arkhitektury,
redaktor; PALLADINA, G.A., redaktor; MEDVEDEV, L.Ya., tekhnicheskiy
redaktor.

[Hospital buildings; proposals for planning standard designs of
hospital buildings for industrial construction] Bol'nichnye zdaniiia;
predlozheniia po tipovomu proektirovaniyu bol'nichnykh zdanii industrial'nogo stroitel'stva. Moskva, Gos. izd-vo lit-ry po stroit.
i arkhitekture, 1954. 51 p.
(Hospitals--Construction)

(MLRA 8:1)

GRADOV, G.A.

25

PHASE I BOOK EXPLOITATION SOV/5494

Vasil'yev, Mikhail Vasil'yevich, and Sergey Zacharovich Gushchev
 Repertuary iz XXI veka; my zapisali rasskazy gradetskoi deyatel'nosti sovetskikh uchenykh o nauchno-tekhnicheskikh budushchikh (Reports from the Twenty-First Century) Stories of Twenty-Nine Soviet Scientists on Science and Engineering of the Future) [Novosibirsk: Izd-vo Sovetskaya Rossiya, 1958. 293 p. 50,000 copies printed.]

Ed. 1 V. A. Golubcov; Tech. Ed.: G. I. Mereva.

PURPOSE : This book is intended for the general reader.

COVERAGE: The book contains 27 articles (cold report card) dealing with probable future progress in physics, chemistry, electricity, metallurgy, engineering, mining, medicine, biology, agriculture, transportation, exploration of space, and photography. Attention is given to automation, automatic underground classification of coal, use of nuclear materials, modernization of oil fields, atomic electrode stations, production of metal parts by the process of explosion, explosions Card-177

Reports From the Twenty-First (Cont.)

SOV/5494

In dam construction, cancer, internal longevity reserves, machine diagnosis of illnesses, surgery to combat sonic vibrations, mechanical heart substitutes, human body banks, medical engineering, enriched foods, supergrillakers, artificial snowballs, agriculture vs. "mechaniculture", radiochemistry, power beam vs. wire machines doing intellectual work, self automobiles (with "radio motors"), "artificial sun" (electromagnetic rays focused above a city which cause heated molecules to shine), future ocean ships, railway dredges, Moscow of the future, moving pavements, wheelless and driverless automobiles, electric oceans, the industrialization of Siberia, use of underground heat, delicate operations living on the moon, antimatter, and photon jet. Names of the interviewed scientists are given. There are no references.

TABLE OF CONTENTS:

Mission Into the Future
 Card-27

5

Reports From the Twenty-First (Cont.)

SOV/5494

Learn to Dream [A. N. Nesmeyanov, Academician]

10

THE FUNDAMENTAL AND MOST IMPORTANT THINGS

25

Transformation of Elements -- the Future of Metallurgy [I. P. Barinov, Academician, Vice-President, AS USSR]
 What Are Breathing Their Last [I. S. Garkusha, Director of Vsesoyuzny nauchno-issledovatel'skiy institut "Podzemgaz," All-Union Scientific Research Institute of Underground Gasification of Coal -- and N. A. Fedorov, Deputy Director for the Scientific Sections]

34

Automatic Oil Field [S. I. Mironov, Academician, and N. A. Kapel'shnikov, Corresponding Member, AS USSR]
 From the Sources [A. V. Vinograd, Academician]

45

51

Card 3/7

Reports From the Twenty-First (Cont.)

SOV/5494

JAUNTS, EXCURSIONS, AND TRAVELS

On Land, at Sea, and in the Air [V. V. Zvonkov, Corresponding Member, AS USSR]	157
Through 21st-Century Moscow [N. F. Yevstratov, Director of Institut general'nogo plana Moskvy -- Institute of Moscow's General City Planning]	165
Model of the Year 2007 [Yu. A. Dolmatovskiy, Engineer]	171
A Picture of the [Future] School [G. A. Gradov, Director of the Institut proyektirovaniya obshchestvennykh zdaniy i sooruzheniy -- Institute for Designing Public Buildings and Structures -- and A. Ye. Pozharskiy, Assistant Director]	175
Magnetic Photographs and Films [Ye. M. Goldovskiy]	183
Siberia Through a Stratoplane Window [L. V. Pustovalov, Corresponding Member, AS USSR, Vice-Chairman, Sovet po izucheniyu Card 6/7]	

GRADOV, G.A.; KALININA, G.F.; MODEL', A.M.; NEVRAYEV, G.A.; SAMOYLOV,
A.V. [deceased]; SVIRSKIY, V.A.; KOSITSKIY, Ya.V., kand. srkhit.,
nauchnyy red.; MANIKOV, M.Ye., kand. med. nauk, nauchnyy red.;
MOROZOVA, G.V., red.; BRUSINA, L.N., tekhn. red.

[Sanatoriums and rest homes; manual on designing] Sanatorii i doma
otdykha; posobie po proektirovaniu. Moskva, Gosstroizdat, 1962.
223 p.

(MIRA 15:7)

1. Akademiya stroitel'stva i arkhitektury SSSR. Institut obshche-
stvennykh zdaniy i sooruzhenii.

(Sanatoriums) (Labor rest homes)

"APPROVED FOR RELEASE: 03/13/2001

CIA-RDP86-00513R000516520001-1

GRADOV, G.L.; PEDAN, M.P.

Book on the development of the building materials industry ("Problems in the development of the building materials industry". O.O.Khranov. Revived by H.L.Hradov, M.P.Pedan). Visnyk AN URSR 27 no.1:74-76 Ja'56. (Ukraine--Building materials) (MLRA 9:6)

APPROVED FOR RELEASE: 03/13/2001

CIA-RDP86-00513R000516520001-1"

PRIBYL'SKIY, Ivan Stepanovich [Prybyl's'kyi, I.S.]; GRADOV, G.L.
[Hradov, H.L.], kand.ekonom.nauk, otv.red.; STAROSTENKO,
T.M., red.

[The Kherson Economic Administrative Region] Khersons'kyi
ekonomichnyi administrativnyi raion. Kyiv, 1960. 29 p.
(Tovarystvo dlia poshyrennia politychnykh i naukovykh znan'
Ukrains'koi RSR. Ser.2, no.11). (MIRA 14:2)
(Kherson Province--Industries)

NESTERENKO, O.O., otv.red.; BARANOVSKIY, A.M. [Baranov's'kyi, A.M.],
red.; KOROID, O.S., kand.ekonom.nauk, red.; GORELIK, L.Ye.
[Gorelik, L.E.], doktor ekonom.nauk, red.; GRADOV, G.L.
[Gradov, H.L.], kand.ekonom.nauk, red.; KOZAKEVICH, T.A., red.
izd-va; RAKHIMA, N.P., tekhn.red.

[The national economy of the Ukrainian S.S.R. in the seven-year
plan; its present-day conditions and prospects for its development]
Narodne hospodarstvo Ukrains'koi RSR u semyrichsei; suchasnyi stan
i perspektyvy rozv'ytku. Kyiv, 1960. 519 p. (MIRA 13:11)

1. Akademiya nauk USSR, Kiyev. Institut ekonomiki. 2. Chlen-korre-
spondent AM USSR (for Nesterenko). 3. Pervyy zamestitel' predse-
detelya Gosplana Ukrainskoy SSR (for Baranovskiy).
(Ukraine--Economic conditions) (Ukraine--Economic policy)

BUKHALO, S.M., doktor ekon. nauk, prof.; VOLOBOY, P.V., kand. ekon. nauk; KUGUKALO, I.A.[Kuhukalo, I.A.], kand. ekon. nauk; PALAMARCHUK, M.M., doktor ekon. nauk, prof.; SLYUSAR, V.D., kand. ekon. nauk; GLADYSHEV, I.S.[Hladyshev, I.S.], st. inzh.-ekonomist; TSYASHCHENKO, P.S., kand. ekon. nauk; PETRUNEVICH, E.G. [Petrunevych, IE.H.], st. inzh.-ekonomist; GRADOV, G.L.[Hradov, H.L.], kand. ekon. nauk; KHAZANET, S.M., red.

[The economic regions of the Ukrainian S.S.R.; a manual] Ekonomichni raiony URSR; dovidnyk. Kyiv, Naukova dumka, 1965.
190 p. (MIRA 18:5)

1. Sovet po izucheniyu produktivnykh sil Ukrainskoy RSR
Gosudarstvennogo planovogo komiteta Ukr. RSR(for all except
Khazanet).

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CIA-RDP86-00513R000516520001-1

NIKOLAYEV, Vl.; POCHIVALOV, L.; GRADOV, R., red.; SHIROKOVA, S.,
tekhn. red.

[At the two poles] U dvukh poliusov. Moskva, Izd-vo "Pravda"
1962. 79 p. (Biblioteka "Komsomol'skoi pravdy," no.5)
(MIRA 15:6)
(Polar regions) (Scientific expeditions)

APPROVED FOR RELEASE: 03/13/2001

CIA-RDP86-00513R000516520001-1"

GRADOV, R. red.; VESELOVSKAYA, V., tekhn. red.

[Orbit of miracles] Orbity chudes. Moskva, Izd-^u
"Pravda," 1963. 61 p. (Biblioteka "Komsomol'skoi pravdy,"
no.5) (MIRA 16:5)

(electronics)

OGANOV, G.; CHIKIN, V.; GRADOV, R., red.; SUROVTEVA, S., tekhn.
red.

[How do we get to Mars?] Na Mars - s chem? Moskva, Izd-vo
"Pravda," 1963. 79 p. (Biblioteka "Komsomol'skoi pravdy,"
no.12) (MIRA 17:2)

L 45393-65 RWP(c)/RWA(h)/RWP(k)/RWT(d)/RWT(l)/R/RWP(l)/RWP(r) PR-L (peb)

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SOVIET UNION, RUSSIA, USSR, RUSSIAN FEDERATION

SOVIET INSTITUTE OF INVENTIONS AND DESIGN

* * * Prulleten' izobreteniy i tvarynykh znakov, no. 7, 1965, 125

Railroad track, flaw detector, ultrasonic type

Patent certificate presented at the All-Union Exhibition

Car with test heads located over various parts of the rail surface
for detection, a recorder for recording the flaws found, and an electronic

control unit.

The device has two test heads.

One is a probe.

The other is a transducer.

It

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OTTER CREEK

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"APPROVED FOR RELEASE: 03/13/2001

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"APPROVED FOR RELEASE: 03/13/2001

CIA-RDP86-00513R000516520001-1

GIK, D.L., kand.tekhn.nauk; MEDVED', O.V.; GRADOV, Z.A.

The composition of glass for kinescope screens. Stek.i ker. 19
no.11:16-17 N '62. (MIRA 15:12)

1. L'vovskiy politekhnicheskiy institut.
(Cathode ray tubes) (Glass-metal sealing)

APPROVED FOR RELEASE: 03/13/2001

CIA-RDP86-00513R000516520001-1"

SOV/126-6-4-32/34

AUTHORS: Rozenberg, V. M. and Gradova, L. V.

TITLE: Phenomena Associated with Grain Boundaries in the Case of High Temperature Deformation of a Solid Solution of Titanium in Nickel (Yavleniya, svyazannyye s granitsami zeren pri vysokotemperaturnoy deformatsii tverdogo rastvora titana v nikel'e)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1958, Vol 6, Nr 4, pp 765-767 (USSR)

ABSTRACT: Data are given relating to the displacement of grain boundaries in solid solutions of titanium in nickel containing 3.6% Ti. The stretching of the specimens was effected in vacuum at 700 or 900°C after preliminary annealing at 1200°C for 2 to 3 hours. The micro-structure photos, Figs 1 and 2, show the displacement of the grain boundary in a specimen stretched at 700°C by means of a load of 8 kg/mm². The displacement of the bent boundary, on which the observations were carried out, took place in the direction away from the centre of curvature. This seems to indicate that the moving force of the displacement is not the difference in the magnitude of the surface energy of the grains but the difference in the elastic

Card 1/4

SOV/126-6-4-32/34

Phenomena Associated with Grain Boundaries in the Case of High Temperature Deformation of a Solid Solution of Titanium in Nickel

energy of each of the grains. Fig 3 shows the case of displacement of boundaries which is accompanied by the formation of sliding lines in the specimen (Ni, 600°C, $\sigma = 3.5 \text{ kg/mm}^2$). At a higher test temperature the displacement of boundaries can be so large that in individual cases it is possible to observe a gradual cessation of the grain. It can be seen from Fig.4 how an initially large grain is gradually "eaten up" by its neighbours. The photographs depict individual stages of the displacement. It can be seen clearly that this takes place with breaks: each break corresponds to a certain position of the boundary. The observed change in the structure can also be explained by the displacement of the grains relative to each other. Such a displacement should bring about a buckling of individual grains which, under the microscope, can be seen as the growth of one grain at the expense of another (this was pointed out by E. S. Yakovleva). Three photographs are reproduced in Fig 4 and it can be stated that the

Card 2/4

SOV/126-6-4-32/34

Phenomena Associated with Grain Boundaries in the Case of High Temperature Deformation of a Solid Solution of Titanium in Nickel

observed picture is due mainly to the growth of one grain at the expense of the other and not to buckling. This view seems to be supported by the conservation of traces of original boundaries at the individual stages of growth and also by the possibility of simultaneous focussing of all grains during observation with a microscope and a magnification of 200 times. It is known that the grain growth in the case of selective recrystallisation is stimulated by the difference between the surface energies of the conjugate grains. Selective recrystallisation can take place at a sufficiently high temperature when the mobility of the atoms becomes high enough. Since on the one hand, prior to applying tensile stresses, the specimens were annealed at 1200°C and on the other hand, cases were observed of displacement of the boundaries which lead to an increase in the grain surface, the assumption can be expressed that in the here described cases the state of minimum free energy

Card 3/4

SOV/126-6-4-32/34

Phenomena Associated with Grain Boundaries in the Case of High Temperature Deformation of a Solid Solution of Titanium in Nickel

to which the system tends during stretching is not based on achieving the minimum surface energy but on redistributing the elastic energy between the grains. The total magnitude of the elastic energy is determined by the magnitude of the applied stress. There are 4 figures.

(Note: This is a complete translation except for the introductory paragraph)

ASSOCIATION: Institut metallovedeniya i fiziki metallov TsNIIChM
(Institute of Metallography and Metal Physics
TsNIIChM)

SUBMITTED: May 7, 1957

Card 4/4

SOV/126--7-5-15/25

AUTHORS: Rozenberg, V. M. and Gradova, L. V.

TITLE: Changes in the Structure of Nickel and Solid Solutions of Titanium in Nickel During High Temperature Deformation
(Izmeneniye struktury nikelya i tverdykh rastvorov titana v nikeli pri vysokotemperaturnoy deformatsii)

PERIODICAL: Fizika metallov i mettallovedeniye, Vol 7, Nr 5, pp 722-731
(+ 1 plate) (USSR) 1959

ABSTRACT: In this paper the nature of structural changes in nickel and solid solutions of titanium in nickel during deformation at high temperatures (700 and 900°C) were studied. The composition of the materials studied is shown in Table 1. In order to obtain uniform grain size of 0.2-0.3 mm the alloys were initially annealed at 1200°C (the alloy no. 134 for 1 hour, no.136 for 2 hours and no.137 for 3 hours). The load was selected so that fracture should occur after a few tens of hours. That deformation at which failure occurred after a few hours is called rapid, and that at which it occurred after a few tens of hours slow. The specimens were pulled in a vacuum apparatus. In Table 2 the conditions under which the specimens were pulled, and the essential test results, are shown. The nickel specimen no.134-1

Card
1/5

SOV/126--7-5-15/25

Changes in the Structure of Nickel and Solid Solutions of Titanium in Nickel During High Temperature Deformation

(the temperature for pulling was 700°C , stress 5.2 kg/cm^2) can be considered as an example which shows the changes in microstructure occurring under the action of stresses which lead to rapid fracture. In Figs.1 and 2 photomicrographs taken at various stages of straining of the specimens are shown. Fig.3 shows the structure in the vicinity of the fracture. The specimens were also studied by X-rays. In all cases a few sharp points are seen in the X-ray photograph taken of an undeformed specimen (see Fig.4). In Fig.5 a series of X-ray photographs is shown, taken of the same point of the specimen at various stages of expansion. A similar change in microstructure and X-ray picture obtained for specimen no.134-1 was also observed for specimen no.134-2 (700°C , stress 3.5 kg/mm^2), no.136-2 (700°C , 8 kg/mm^2) and no.137-2 (700°C , 8 kg/mm^2). In the deformation under the influence of stress which leads to fracture after a few tens of hours, the change of microstructure differs from the above changes and is noticeably independent of the pulling temperatures used in the experiments.

Card
2/5

SOV/126---7-5-15/25

Changes in the Structure of Nickel and Solid Solutions of Titanium in Nickel During High Temperature Deformation

As an example, the deformation of specimen no.137-5 (Ni + 6.3% Ti) at 900°C and stress of 2 kg/mm², is discussed. In Figs. 6, 7 and 8 the microstructure of a specimen after a 4% deformation and fracture is shown. Sub-grains appear not only in grains in which intense slippage has occurred but also in those in which only barely noticeable signs of slip are evident. When the sub-grains are noticeable in the slip lines it can be seen that there is a definite connection between the direction of the slip lines and the sub-grains: the long side of the latter is perpendicular to the slip lines (see Figs. 9, 10 and 11). In slow deformation the appearance of X-ray photographs taken of the specimens also changes. In Fig. 12 portions of X-ray photographs taken of the specimen no.137-5 are shown. The changes in structure described for specimen no.137-6, tested at 900°C at a stress of 2 kg/mm² are also observed for nickel (900°C, 2 kg/mm²) and for nickel containing 5.6% Ti (900°C, 2 kg/mm²; 700°C, 4 kg/mm²). In Fig. 13 a photomicrograph of the specimen no.135-7

Card
3/5

SOV/126. --7-5-15/25

Changes in the Structure of Nickel and Solid Solutions of Titanium in Nickel During High Temperature Deformation

(nickel + 3.6% Ti) after straining by 9.5% is shown. This specimen was deformed at 700°C at a stress of 3.9 kg/mm². At 700 and 900°C fracture of the specimen occurred along the grain boundaries at all stresses. As a result of the above investigations the authors have arrived at the following conclusions:

1. In the deformation of nickel and solid solutions of titanium in nickel at high temperatures, formation of slip planes, fragmentation of grains and displacement of grains relative to each other can be observed.
2. The fragmentation of grains in slow deformation at high temperatures does not appear to be the primary direct breaking down process of the original grain. It is associated with the preliminary non-uniform deformation of the latter, leading to local bending of the crystal. The observable fragmentation is a particular case of polygonization occurring under the simultaneous action of temperature and deformation. In the region 700-900°C the possibility of fragmentation is determined essentially by the rate of deformation.

Card
4/5

SOV/126---7-5-15/25

Changes in the Structure of Nickel and Solid Solutions of Titanium in
Nickel During High Temperature Deformation

3. In the process of alloying nickel with titanium fragmentation
of the grains occurs at lower deformation rates than in
pure nickel.

4. The fracture of specimens tested at 700 and 900°C is
intercrystalline in nature.

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5/5 There are 14 figures, 2 tables and 15 references, of which
4 are Soviet, 10 English and 1 Swiss

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